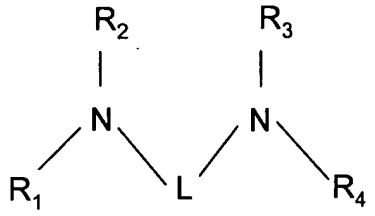
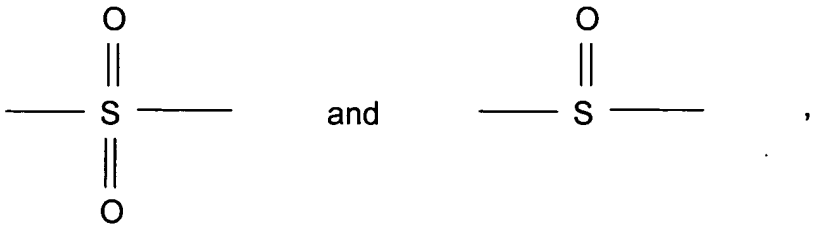
What is claimed is:

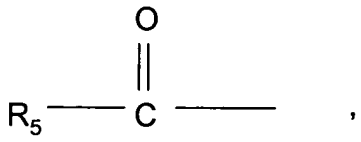
1) A composition of matter useful for forming organic peroxy acids, which comprises a polyamino compound having the structure:



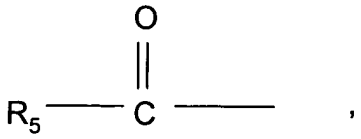
in which L is a divalent radical that is independently selected from the group consisting of:



and wherein R_1, R_2, R_3, and R_4 are each independently selected from the group consisting of: hydrogen, any C_1 to C_{20} hydrocarbyl group, and the group:

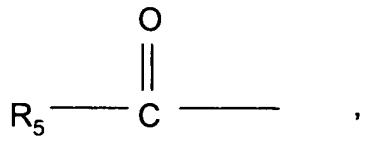


subject to the proviso that: at least one of R_1, R_2, R_3, and R_4 are the group:



in which R_5 is in each occurrence independently hydrogen or any C_1 to C_{20} hydrocarbyl group.

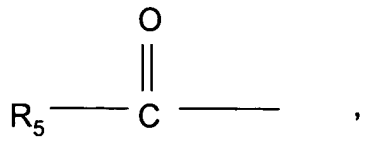
2) A composition according to claim 1 wherein one and only one of R_1, R_2, R_3, and R_4 is the group:



,

in which R_5 is independently hydrogen or any C_1 to C_{20} hydrocarbyl group.

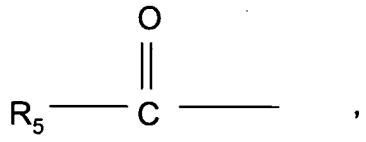
3) A composition according to claim 2 wherein at least one of the groups of R_1, R_2, R_3, and R_4 which are not the group:



,

is hydrogen.

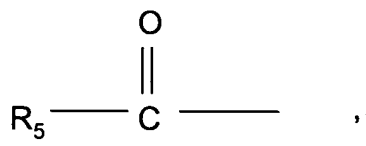
4) A composition according to claim 2 wherein at least one of the groups of R_1, R_2, R_3, and R_4 which are not the group:



,

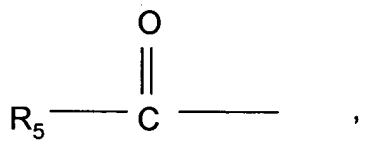
is independently in each occurrence any C_1 to C_{20} hydrocarbyl group.

5) A composition according to claim 1 wherein any two of R_1, R_2, R_3, and R_4 are the group:



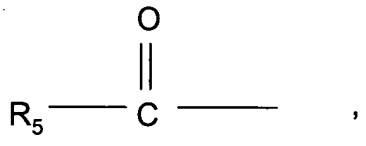
in which R_5 is independently in each occurrence hydrogen or any C_1 to C_{20} hydrocarbyl group.

6) A composition according to claim 5 wherein at least one of the groups of R_1, R_2, R_3, and R_4 which are not the group:



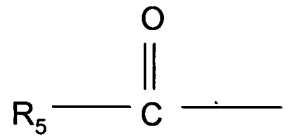
is hydrogen.

7) A composition according to claim 5 wherein at least one of the groups of R_1, R_2, R_3, and R_4 which are not a group:



is independently in each occurrence any C_1 to C_{20} hydrocarbyl group.

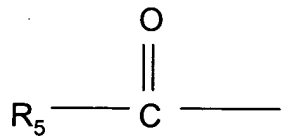
8) A composition according to claim 1 wherein any three of R_1, R_2, R_3, and R_4 are the group:



,

in which R_5 is independently in each occurrence hydrogen or any C_1 to C_{20} hydrocarbyl group.

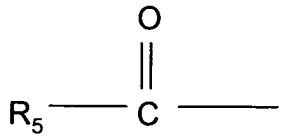
9) A composition according to claim 8 wherein the group of R_1, R_2, R_3, and R_4 which is not a group:



,

is hydrogen.

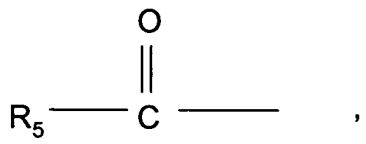
10) A composition according to claim 8 wherein the group of R_1, R_2, R_3, and R_4 which is not a group:



,

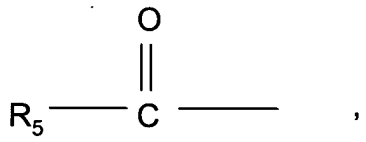
is any C_1 to C_{20} hydrocarbyl group.

11) A composition according to claim 1 wherein all of R_1, R_2, R_3, and R_4 are the group:



in which R_5 is independently in each occurrence hydrogen or any C_1 to C_{20} hydrocarbyl group.

12) A composition according to claim 1 wherein R_1 and R_4 are represented by the group:



in which R_5 is independently in each occurrence hydrogen or any C_1 to C_{20} hydrocarbyl group, and wherein R_2 and R_3 are each independently selected from the group consisting of: hydrogen, and any C_1 to C_{20} hydrocarbyl group.

13) A composition according to claim 12 wherein R_5 in each occurrence is independently selected from the group consisting of: hydrogen, a methyl, an ethyl, a propyl, and a butyl group.

14) A composition according to claim 1 wherein said composition is a dry powder.

15) A composition of matter according to claim 14 which further comprises at least one solid compound which upon being contacted with water yields a peroxide selected from the group consisting of: hydrogen peroxide and peroxide ions.

16) A composition according to claim 15 wherein said solid compound is a compound selected from the group consisting of: alkali metal salts of a percarbonate, alkaline earth metal salts of a percarbonate, alkali metal salts of a perborate, and alkaline earth metal salts of a perborate.

17) A composition according to claim 15 wherein the total amount of said amino compound in said composition is between about 0.1 % and about 5 % by weight based on the total weight of said composition.

18) A process for providing an aqueous peroxy acid comprising the steps of: contacting a composition according to claim 1 with an aqueous peroxide.

19) A process according to claim 18 wherein said peroxide is selected from the group consisting of: hydrogen peroxide and peroxide ions.

20) An aqueous solution comprising a composition according to claim 1.

21) An aqueous solution according to claim 20 wherein the amount of water present in said aqueous solution is any amount between about 80 % and about 99.95 % by weight based on the total weight of said aqueous solution.

22) A solution according to claim 20 wherein said amino compound is present in any amount between about 0.1 % and about 5 % by weight based upon the total weight of said aqueous solution.

23) A solution according to claim 20 further comprising an aqueous buffer.

24) A solution according to claim 20 further comprising at least one surfactant selected from the group consisting of: anionic surfactants, non-ionic surfactants, and cationic surfactants.

25) A solution according to claim 20 further comprising at least one sequesterant.

26) A composition comprising the aqueous solution of claim 20 and further comprising at least one solid compound which upon being contacted with water yields a peroxide selected from the group consisting of: hydrogen peroxide and peroxide ions.

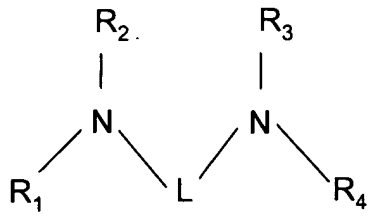
27) A composition according to claim 26 wherein said solid compound is a peroxide-generating compound selected from the group consisting of: alkali metal salts of a percarbonate, alkaline earth metal salts of a

perborate, and alkaline earth metal salts of a perborate, wherein said peroxide-generating compound is present in any amount between about 0.01 % and about 5 % by weight based upon the total weight of said aqueous solution.

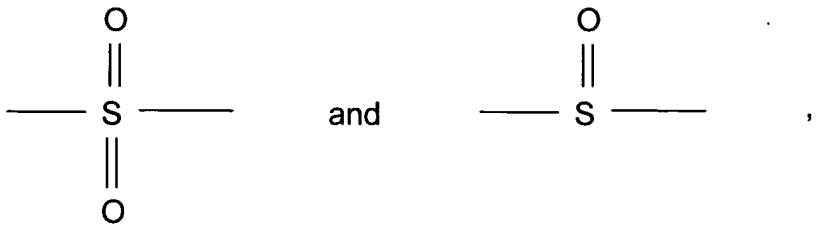
28) A process for disinfecting a surface comprising the steps of contacting said surface with an aqueous composition that is formed from mixing:

a) water;

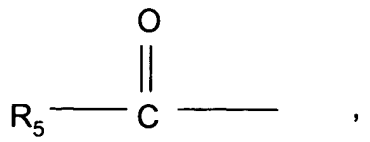
b) a composition of matter which comprises an amino compound having the structure:



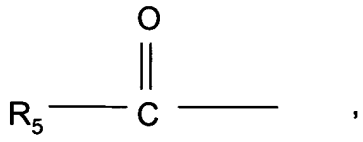
in which L is a divalent radical that is independently selected from the group consisting of:



and wherein R_1, R_2, R_3, and R_4 are each independently selected from the group consisting of: hydrogen, any C_1 to C_{20} hydrocarbyl group, and the group:



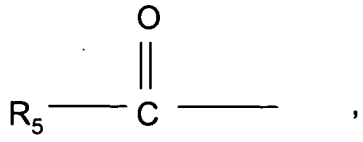
subject to the proviso that: at least one of R_1, R_2, R_3, and R_4 are the group:



in which R_5 is independently in each occurrence hydrogen or any C_1 to C_{20} hydrocarbyl group; and

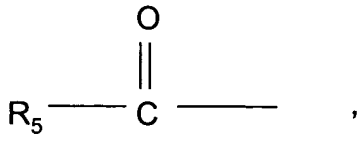
c) a source of peroxide.

29) A process according to claim 28 wherein one and only one of R_1, R_2, R_3, and R_4 is the group:



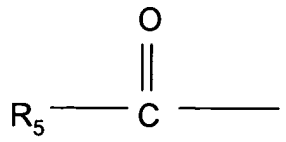
in which R_5 is independently hydrogen or any C_1 to C_{20} hydrocarbyl group.

30) A process according to claim 29 wherein at least one of the groups of R_1, R_2, R_3, and R_4 which are not the group:



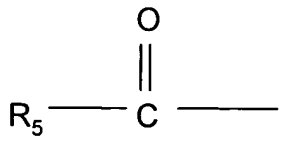
is hydrogen.

31) A process according to claim 29 wherein at least one of the groups of R_1, R_2, R_3, and R_4 which are not the group:



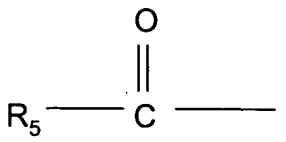
is independently in each occurrence any C_1 to C_{20} hydrocarbyl group.

32) A process according to claim 28 wherein any two of R_1, R_2, R_3, and R_4 are the group:



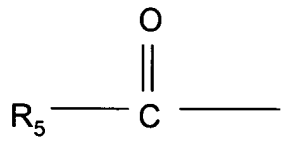
in which R_5 is independently in each occurrence hydrogen or any C_1 to C_{20} hydrocarbyl group.

33) A process according to claim 32 wherein at least one of the groups of R_1, R_2, R_3, and R_4 which is not a group:



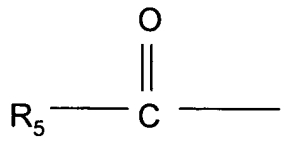
is hydrogen.

34) A process according to claim 32 wherein at least one of the groups of R_1, R_2, R_3, and R_4 which is not a group:



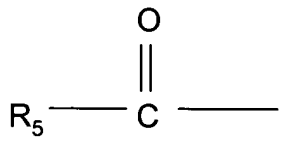
is independently in each occurrence a C_1 to C_{20} hydrocarbyl group.

35) A process according to claim 28 wherein any three of R_1, R_2, R_3, and R_4 are the group:



in which R_5 is independently in each occurrence hydrogen or any C_1 to C_{20} hydrocarbyl group.

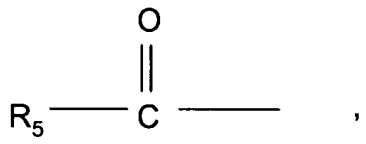
36) A process according to claim 35 wherein the group of R_1, R_2, R_3, and R_4 which is not a group:



is hydrogen.

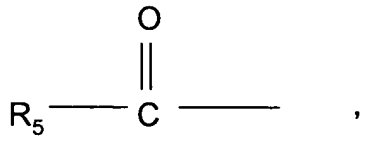
Inventors: David W. Hobson and Danny O. Helton
Docket Number 031004
Agent: Christopher J. Whewell, Reg. No. 37,469

37) A process according to claim 35 wherein the group of R_1, R_2, R_3, and R_4 which is not a group:



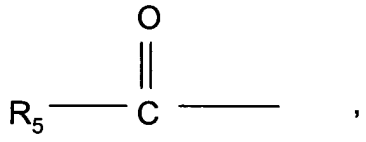
is any C_1 to C_{20} hydrocarbyl group.

38) A process according to claim 28 wherein all of R_1, R_2, R_3, and R_4 are the group:



in which R_5 is independently in each occurrence hydrogen or any C_1 to C_{20} hydrocarbyl group.

39) A process according to claim 28 wherein R_1 and R_4 are the group:



in which R_5 is independently in each occurrence hydrogen or any C_1 to C_{20} hydrocarbyl group, and wherein R_2 and R_3 are each independently selected from the group consisting of: hydrogen and any C_1 to C_{20} hydrocarbyl group.

40) A process according to claim 39 wherein R_5 in each occurrence is independently selected from the group consisting of: hydrogen, a methyl, an ethyl, a propyl, and a butyl group.

41) A process according to claim 41 wherein said source of peroxide is a solid compound which upon being contacted with water yields a peroxide.

42) A process according to claim 41 wherein said source of peroxide is selected from the group consisting of: alkali metal salts of a percarbonate, alkaline earth metal salts of a percarbonate, alkali metal salts of a perborate, and alkaline earth metal salts of a perborate.

43) A process according to claim 41 wherein said peroxide is selected from the group consisting of: hydrogen peroxide and peroxide ions.

44) A process according to claim 40 wherein said aqueous composition is formed using between about 0.1 % and about 5 % by weight of said amino compound based on the total weight of said composition.

45) A process according to claim 40 wherein said aqueous composition contains between about 0.1 % and about 5 % by weight of water based on the total weight of said composition.

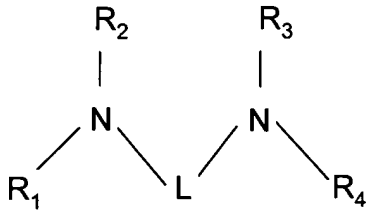
46) A process according to claim 40 wherein said aqueous composition is formed using between about 0.1 % and about 5 % by weight of said source of peroxide based on the total weight of said composition.

47) A process according to claim 40 wherein said surface comprises a surface selected from the group consisting of: medical instruments, medical devices, animal stalls, animal transportation equipment, a mold-infested surface, heating and air conditioning ducts, the interior surfaces of dwellings for human habituation, the interior surfaces of office buildings, open wounds and cuts, fruits, vegetables, meats, tank cars, military vehicles, aircraft, ships, boats, passenger cars, trains, and buses.

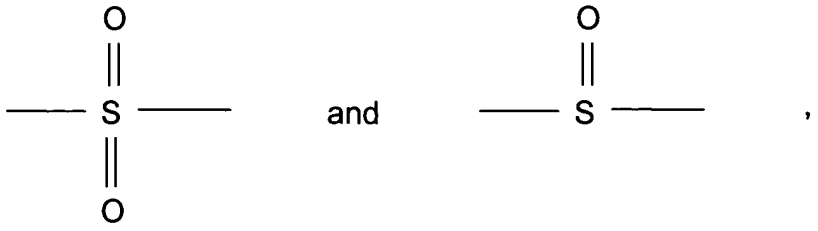
48) A process for volatilizing a peroxy acid which comprises mixing:

a) water;

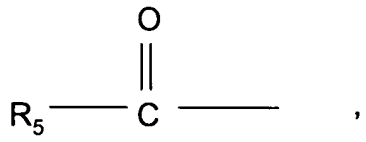
b) a composition of matter which comprises an amino compound having the structure:



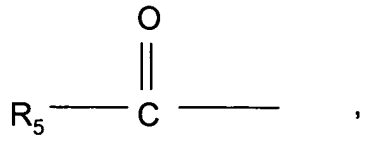
in which L is a divalent radical that is independently selected from the group consisting of:



and wherein R_1, R_2, R_3, and R_4 are each independently selected from the group consisting of: hydrogen, any C_1 to C_{20} hydrocarbyl group, and the group:



subject to the proviso that: at least one of R_1, R_2, R_3, and R_4 are the group:

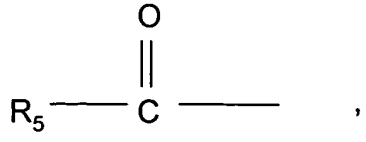


in which R_5 is in each occurrence independently hydrogen or any C_1 to C_{20} hydrocarbyl group; and

c) a source of peroxide,

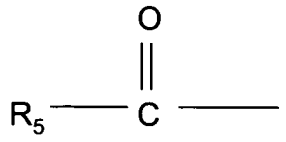
under conditions sufficient to enable evolution of vapors of peroxy acid from the aqueous solution so formed.

49) A process according to claim 48 wherein one and only one of R_1, R_2, R_3, and R_4 is the group:



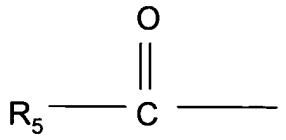
in which R_5 is independently hydrogen or any C_1 to C_{20} hydrocarbyl group.

50) A process according to claim 49 wherein at least one of the groups of R_1, R_2, R_3, and R_4 which are not the group:



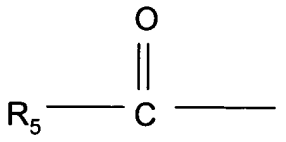
is hydrogen.

51) A process according to claim 49 wherein at least one of the groups of R_1, R_2, R_3, and R_4 which are not the group:



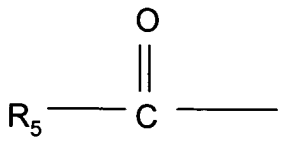
is independently in each occurrence any C_1 to C_{20} hydrocarbyl group.

52) A process according to claim 48 wherein any two of R_1, R_2, R_3, and R_4 are the group:



in which R_5 is independently in each occurrence hydrogen or any C_1 to C_{20} hydrocarbyl group.

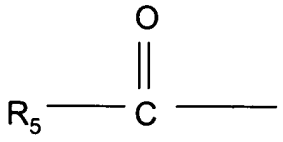
53) A process according to claim 52 wherein at least one of the groups of R_1, R_2, R_3, and R_4 which is not a group:



,

is hydrogen.

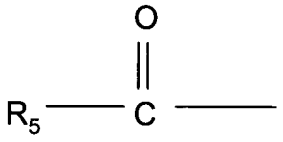
54) A process according to claim 52 wherein at least one of the groups of R_1, R_2, R_3, and R_4 which is not a group:



,

is independently in each occurrence any C_1 to C_{20} hydrocarbyl group.

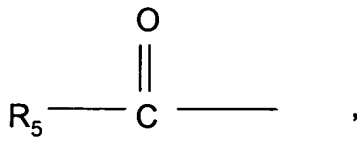
55) A process according to claim 48 wherein any three of R_1, R_2, R_3, and R_4 are the group:



,

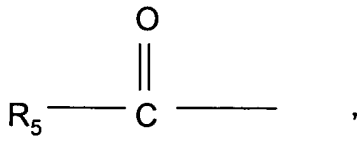
in which R_5 is independently in each occurrence hydrogen or any C_1 to C_{20} hydrocarbyl group.

56) A process according to claim 55 wherein the group of R_1, R_2, R_3, and R_4 which is not a group:



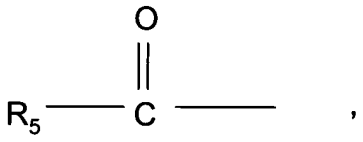
is hydrogen.

57) A process according to claim 55 wherein the group of R_1, R_2, R_3, and R_4 which is not a group:



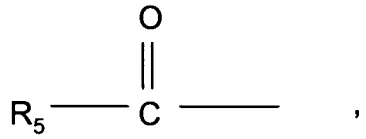
is any C_1 to C_{20} hydrocarbyl group.

58) A process according to claim 48 wherein all of R_1, R_2, R_3, and R_4 are the group:



in which R_5 is independently in each occurrence hydrogen or any C_1 to C_{20} hydrocarbyl group.

59) A process according to claim 48 wherein R_1 and R_4 are the group:



in which R_5 is independently in each occurrence hydrogen or any C_1 to C_{20} hydrocarbyl group, and wherein R_2 and R_3 are each independently selected from the group consisting of: hydrogen and any C_1 to C_{20} hydrocarbyl group.

60) A process according to claim 59 wherein R_5 in each occurrence is independently selected from the group consisting of: hydrogen, a methyl, an ethyl, a propyl, and a butyl group.

61) A process according to claim 48 wherein the concentration of peroxy acid in the atmosphere at the surface of said aqueous solution is at least about 0.1 grams/ m^3.

62) A process for disinfecting various microbes, including bacteria, molds, fungi and their spores which comprises contacting the vapor of peroxy acid generated according to claim 20 and in conjunction with a conventional means of vaporization selected from the group consisting of: heat, venturi nebulization, and sonication with at least one of said microbes.